Statement of Work MIST TASK 164

Task Name: Engineering support for Multi-Axis Heterodyne Interferometry (MAHI) project

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1. BACKGROUND

[ORIGINAL SOW]

The next generation of space-based astrophysics instrumentation will help to answer profound questions concerning the origins of today's universe, the physical laws that govern it, and our place within it. A number of these instruments require ultra-precise measurement of the positions and angles of numerous subcomponents to achieve their scientific goals. These metrology needs can be achieved by combining the techniques of heterodyne interferometry, in which a reference beam at one frequency is compared to a measurement beam at another frequency, and differential wavefront sensing, which uses the structure of this single interference pattern to simultaneously extract both position and angle information. In 2015, an Astrophysics Research and Analysis (ARPA) grant was awarded to NASA/GSFC (PI: Thorpe) to develop and test a prototype Multi-Axis Heterodyne Interferometry (MAHI) system. Following a lengthy search, a postdoctoral researcher to lead this effort was hired in Summer 2016. The purpose of this task is to provide engineering and technician support to the MAHI project as the prototype is developed, assembled, and tested.

[2017 MOD SOW]

The primary purpose of this task modification is to extend the duration of the primary task of supporting the development and test of the MAHI prototype in the laboratory. Building on the successful test campaign for the Phase I prototype; the contractor will provide engineering and technician support for the Phase II prototype. In addition to the prototype-focused work, this modification adds scope to provide design and CAD support for preliminary engineering studies of the Moving Optical Sub Assembly (MOSA) for the LISA mission study.

2. SCOPE

3. OBJECTIVES

The primary objective of this task is to develop a mechanical design for the MAHI Phase II prototype based on the optical design developed by the MAHI team, prepare this design for manufacture (drawings and specs), and assist in assembly and test of the prototype.

The secondary objective is to work with the LISA Study Office and team members in the Gravitational Astrophysics Laboratory to develop and model a design for the LISA MOSA.

4. TASKS/REQUIREMENTS

1. Develop a mechanical design for the MAHI Phase II prototype in close collaboration with the MAHI team members developing the optical design.
2. Develop mechanical designs for any fixtures or jigs needed to assemble the optical components of the MAHI Phase II prototype.
3. Prepare mechanical designs for manufacture by generating shop drawings and specifications and interacting with potential vendors (both on-site and off-site) to develop quotes.
4. Support assembly and test of the Phase II prototype in the Code 663 laboratory
5. Develop a mechanical design for the LISA MOSA in collaboration with team members in 663 and the NASA Study Office

5. DELIVERY

ATA will deliver to the Task Order Monitor:

1. CAD model of the MAHI Phase II prototype and any associated assembly jigs
2. Drawings and specs for all parts requiring custom manufacture
3. CAD model of the LISA MOSA design

6. GOVERNMENT-FURNISHED PROPERTY

1. There is no government furnished equipment under this task

7. SECURITY REQUIREMENTS

There are no security requirements associated with this Task Order however the processes and results of processes are competition sensitive. The Task Monitor should be notified before data or processes are published and publicly available.

8. PLACE OF PERFORMANCE

The task will be performed at the Godard Space Flight Center.

9. Period of Performance

Period of performance is 14th November 2016 – 30th September 2017

10. Applicable Documents

None

11. Technical Monitor for Task Order

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